

DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

DIRECTOR'S OFFICE

GENERAL INDUSTRY SAFETY STANDARDS

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Bureau of Safety and Regulation, Standards Division Web-Site: www.cis.state.mi.us/bsr/divisions/std

PART 65. MILLS AND CALENDERS FOR RUBBER AND PLASTIC

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R 408.16501. Scope.

Rule 6501. This part provides for the safe maintenance and operation of mills and calenders used in the rubber and plastics trades by employers and their safe use by employees, in, around and about places of employment.

R 408.16503. Definitions; A to C.

Rule 6503. (1) "Aisle" means a path of designated travel for employees and vehicles.

(2) "Calender" means a machine equipped with 2 or more metal rolls in vertical frames and revolving in opposite directions used for continuously sheeting or plying up rubber and plastic compounds and for frictioning or coating materials with rubber and plastic compounds.

R 408.16506. Definitions; M to S.

Rule 6506. (1) "Mill" means a machine consisting of 2 adjacent metal rolls, set horizontally, which revolve in opposite directions and which are used for the mechanical working of rubber and plastic compounds.

(2) "Nip point" means the point where a rotating object creates a pinching action with another rotating object.

(3) "Safety device" means a guard such as, but not limited to, a barrier, enclosure, body bar, safety rod or safety cable used to protect an employee from a hazardous condition.

R 408.16511. Employer's responsibilities.

Rule 6511. An employer shall:

- (a) Provide training to an employee as to the hazards and safe operation of his assigned job.
- (b) Maintain the mills and calenders in a condition free of recognized hazards.
- (c) Establish and maintain a lockout procedure as prescribed in subrule (1) of rule 6527.

R 408.16512. Employee's responsibilities.

Rule 6512. An employee shall:

- (a) Not use a mill or calender unless authorized and trained in its use.
- (b) Not remove a guard or safety device from a mill or calender except when necessary for servicing or where equivalent safety is provided. The guard shall be replaced before restarting the machine. All safety devices shall be replaced and tested before a mill or calender is put back into operation.
- (c) Report defective machinery, equipment and hazardous conditions, when detected, to his supervisor.

R 408.16515. Illumination.

Rule 6515. Illumination shall be provided to maintain a minimum of 20 foot candles intensity at an operator's work station.

R 408.16517. Floors and aisles.

Rule 6517. (1) An aisle or floor area around a mill or calender shall be maintained free of protruding objects, holes, oil, grease and accumulations of water.

(2) The surface of a platform or floor area at an operator's work station shall be maintained in slip resistant condition.

(3) An aisle for combined usage of employees and stock moving equipment shall be 3 feet wider than the widest load moved. The outline of the aisle shall be marked or otherwise identified. When an oversized load is moved, pedestrian traffic shall be warned ahead of the load movement. Where stock moving equipment is not used in an aisle, the aisle shall not be less than 3 feet wide.

R 408.16521. Installation.

Rule 6521. (1) A mill or calender shall be secured in a manner to prevent unintentional movement.

(2) Such a machine, except where installed in a laboratory, shall not be so placed as to require an operator to stand in an aisle.

(3) A mill installed or moved after the effective date of this part shall be installed so that the top of the operating rolls is not less than 50 inches above the floor or the operator's working level.

(4) Installation of auxiliary equipment, such as but not limited to feeding and stock removing equipment and blending rolls, shall be guarded by location, barriers or enclosures so as to not create a hazard. The auxiliary equipment shall not interfere with access or operation of a safety device.

(5) A mill or calender shall be electrically grounded.

R 408.16523. Hot surfaces.

Rule 6523. Steam and hot water pipes and surfaces of machinery exposed to contact, except the mill and calender rolls, which would cause burns, shall be covered with an insulating material or guarded by a barrier.

R 408.16525. Ventilation.

Rule 6525. Materials processed on a mill or calender, which give off noxious or toxic materials that exceed the maximum allowable limits set by the Division of Occupational

Health, shall be equipped with a ventilation system approved for this use.

R 408.16527. Maintenance.

Rule 6527. (1) A power source of a mill, calender or their auxiliary equipment to be repaired, serviced or set up shall be locked out by each employee doing the work if unexpected start up would cause injury. Residual pressure shall be relieved before and during such work when maintenance is performed on a pressurized system.

(2) A braking or safety device for a mill or calender shall be inspected and tested weekly. The stopping distances shall be measured and recorded. Where the braking action does not met or exceeds the requirements of rules 6502 and 6546, repairs or adjustments shall be made before operation is resumed.

R 408.16528. Lubrication.

Rule 6528. (1) Lubrication shall be accomplished by one of the following:

- Manually when the machine can be shut off and locked out.
- An automatic pressure or gravity feed system.
- An extension pipe leading to an area outside of guards or away from any hazard.

FIGURE 1

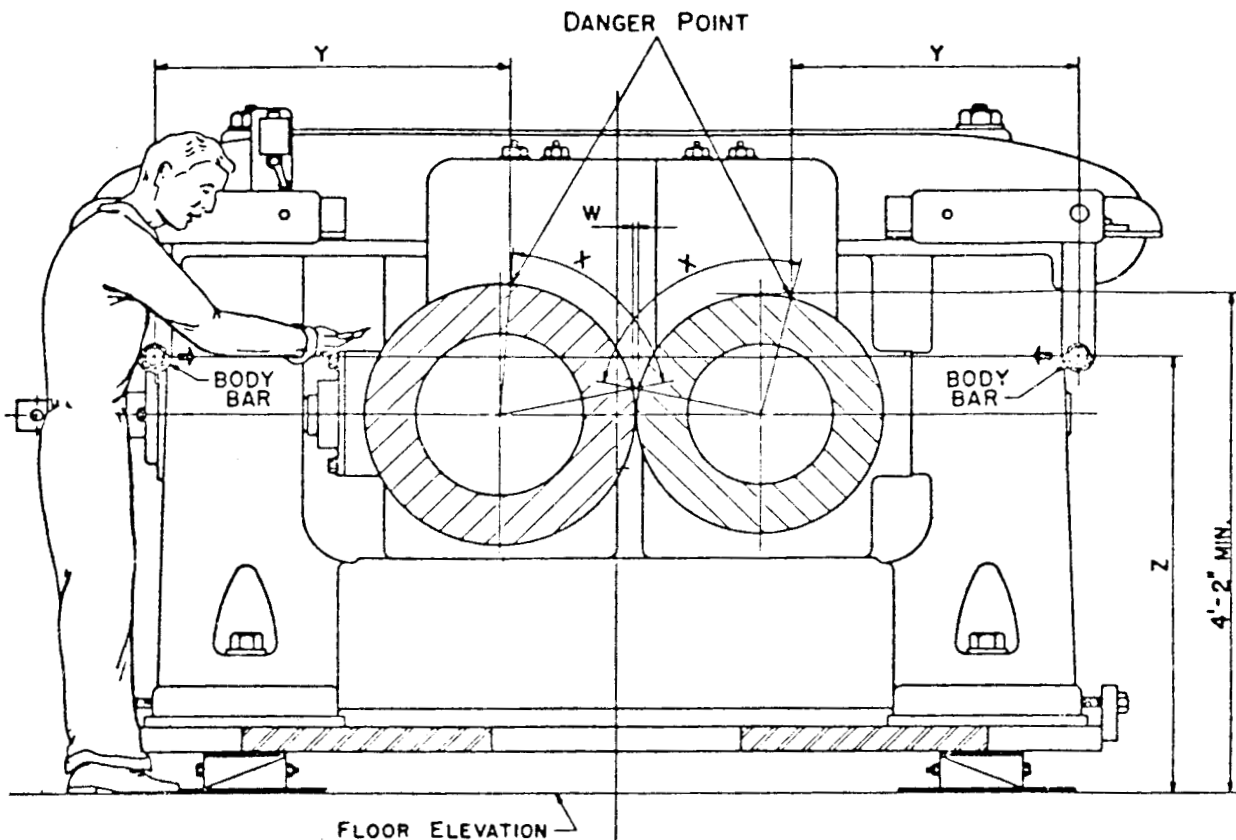


Fig. A8
Installation of Pressure-Sensitive Body Bar

This illustration shows relative position of a man to the pressure-sensitive body bar and the working roll. The body bar is positioned so that the man cannot reach the danger point on the face of the roll without tripping the safety switch.

The danger point is determined as follows:

W represents the thickness of a man's fingers.

X represents the maximum allowable stopping distance.

Y and Z dimensions are such that the man cannot reach the danger point.

A force equal to approximately 40 lbs (in the direction of the arrow) is required to actuate the safety switch.

(d) Other means providing safety equal to or exceeding subdivisions (a), (b), or (c).

(2) In any case rule 732 of the general industry safety standards commission standard, Part 7, Guards for Power Transmission, being R 408.10732 of the Michigan Administrative Code shall be followed.

R 408.16531. Steam pressure procedures.

Rule 6531. (1) Where a pressure reducing valve is used, not less than 1 relief valve, set at not more than the rated pressure of the equipment, shall be provided adjacent to the reducing valve on the low pressure side. The relief valve shall vent to an area which will not create a hazard to an employee.

(2) A steam valve to machinery shall be opened slowly to avoid uneven expansion of a pressure chamber.

(3) A cylinder type machine shall be in motion before steam is admitted.

(4) The rated operating steam pressure of a machine shall not be exceeded.

R 408.16541. Mill safety devices.

Rule 6541. (1) Except where an employee cannot come in contact with a roll nip point or be caught between a roll and an adjacent object because of a fixed installation, a mill

shall be provided with 1 of the following safety trip devices to activate breaking equipment:

(a) A pressure sensitive bar which can be tripped by not more than a 40 pound pressure of an employee's body. The bar shall be installed at the front and back of the mill across the length of the rolls of each mill roll having a height of 46 inches or more. (See figure 1)

(b) A safety rod or safety cable installed at the front and back of a mill and located within 2 inches of a vertical plane tangent to the front and rear rolls. The safety rod or cable shall not be more than 72 inches from the floor of the operator's work level and operate with either a push or pull motion.

(2) A mill having automatic overhead blending rolls shall have the blender interlocked to the mill so that actuation of the mill safety device will stop the blender.

(3) A safety device, after actuation, shall require manual resetting.

(4) A laboratory mill may be guarded by an interlocked barrier in lieu of the requirements of subrule (1).

R 408.16542. Mill stopping limits.

Rule 6542. A mill, regardless of roll size or roll arrangement, shall be stopped by braking equipment within

FIGURE 2

MAXIMUM ALLOWABLE MILL STOPPING
DISTANCES FOR VARIOUS
ROLL SPEEDS

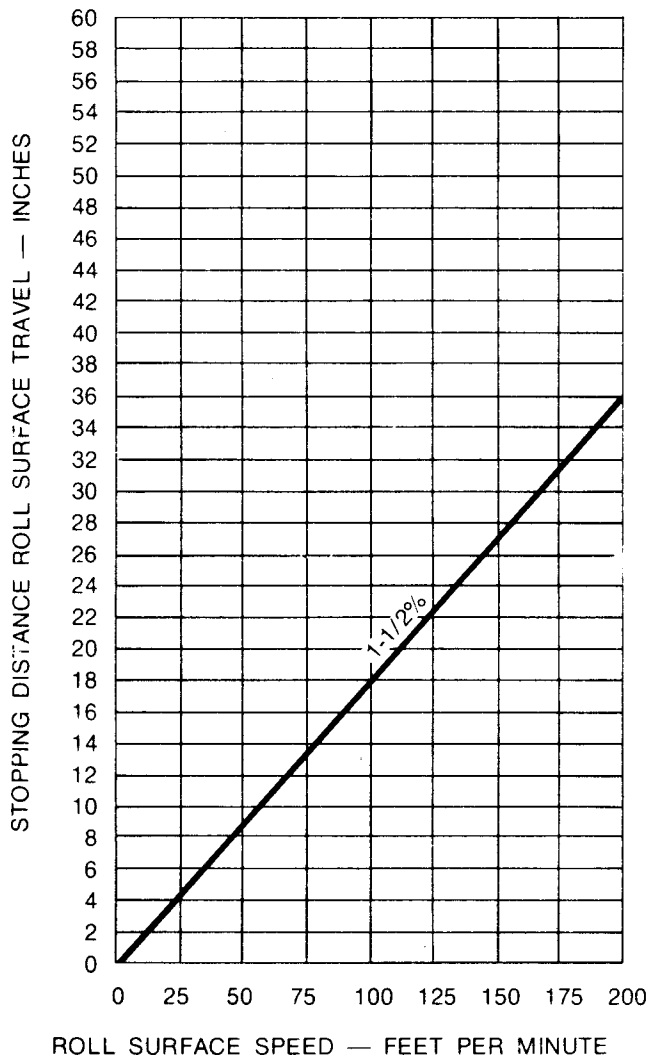
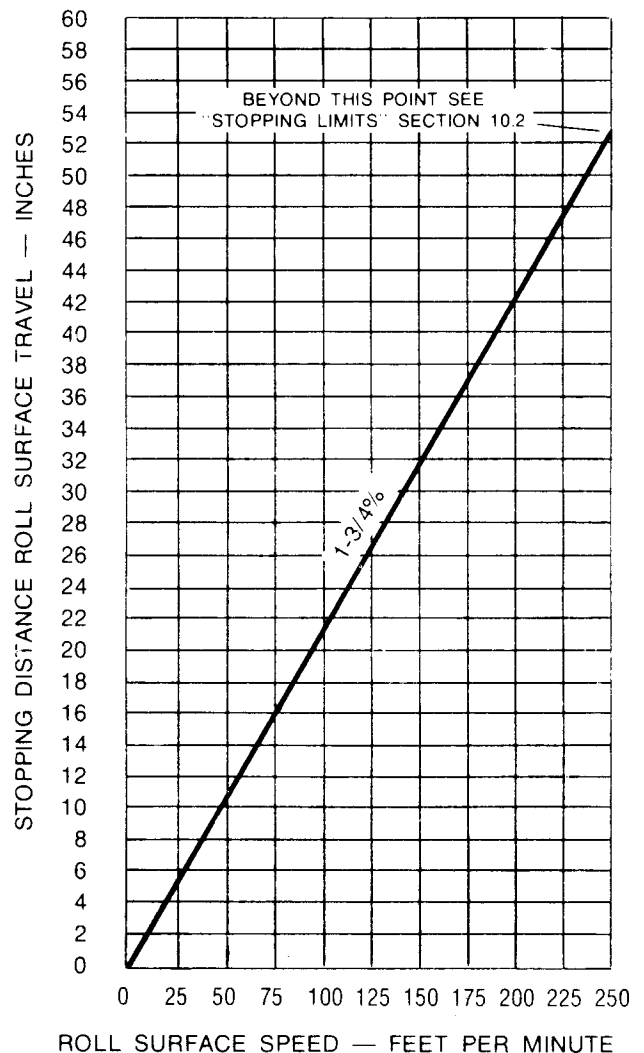


FIGURE 3

MAXIMUM ALLOWABLE CALENDER
STOPPING DISTANCES FOR
VARIOUS ROLL SPEEDS



a distance, measured in inches of surface travel of the faster roll, of not more than 1 1/2% of the peripheral no-load surface speed of the roll as determined in feet per minute. (See figure 2)

All measurements on mills shall be taken with the rolls running empty at maximum operating speed. Stopping distances shall be expressed in inches of surface travel of the faster roll from the instant the emergency stopping device is actuated.

R 408.16545. Calender safety devices.

Rule 6545. (1) Except where an employee cannot come in contact with a roll nip point or be caught between a roll and an adjacent object because of a fixed installation, a calender shall be provided with the following safety trip devices to actuate braking equipment:

- (a) A safety rod or cable located across each pair of inrunning rolls and extending the length of the rolls. The device shall operate with either a push or pull motion. The safety tripping devices shall be located within reach of the operator at the bite.

- (b) A safety cable shall be run vertically on both sides of the calender and connected to the safety switch. The cable shall be not more than 12 inches from the face of the rolls and not less than 2 inches from the calender frame. The cable shall be anchored not more than 6 inches from the floor and operated with either a push or pull motion.

- (2) A safety device, after actuation, shall require manual resetting.

R 408.16546. Calender stopping limits.

Rule 6546. A calender, regardless of size or configuration, shall be stopped by braking equipment within a distance, measured in inches of surface travel of the fastest roll, of not more than 1 3/4% of the peripheral no-load surface speed of the calender rolls as determined in feet per minute. (See figure 3)

All measurements on calenders shall be taken with the rolls running empty at maximum operating speed. Stopping distances shall be expressed in inches of surface travel of the fastest roll from the instant the emergency stopping device is actuated.

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